

Los Alamos

National Laboratory
Los Alamos, New Mexico 87545

SUBCONTRACT AWARD/ PURCHASE ORDER MODIFICATION

ORDER NUMBER MUST APPEAR
ON OUTSIDE OF EACH PACKAGE
AND ON ALL SHIPPING PAPERS
AND INVOICES

PAGE 1 of 5

CONTRACT AWD/PO NO.
38480-001-06 C2

MODIFICATION NO.
1

Operated by Los Alamos National Security, LLC under Government
Contract No. DE-AC52-06NA25396 Dated December 21, 2005

| | | | | |
|---------------------------------|-----------------------------|-----------------------|--------------------------|-----------------------------|
| AWARD/CONFIRMATION DATE | EFFECTIVE DATE | FUNDED AMOUNT | CEILING AMOUNT | CONTRACT TYPE |
| 25 May 2006 | 22 Jan 2007 | \$200,108.00 | \$200,108.00 | Integrated Contractor Order |
| ISSUED BY TERRY CHACON | TELEPHONE (505) 664-0882 | FAX (505) 667-4472 | EMAIL terryc@lanl.gov | |
| ADMINISTERED BY TERRY CHACON | TELEPHONE (505) 664-0882 | FAX (505) 667-4472 | EMAIL terryc@lanl.gov | |

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FERMI NATL ACCELERATOR LAB
P O BOX 500
MAIL STOP 112
BATAVIA, IL 60510
Phone: (630) 840-5798
Fax: (630) 840-2528

CONFIRMED BY:
Michael Smith/Terry 25 May 2006

QUOTED BY:
Michael Smith 17 Apr 2006
Quote #: Cost Breakdown

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Los Alamos National Laboratory
Bldg SM30 Bikini Atoll Road
Los Alamos, NM 87545
REF: 38480-001-06 C2

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Invoice must be mailed to:
Los Alamos National Laboratory
P.O. Box 1663
ATTN: Accounts Payable, M/S P240
Los Alamos, NM 87545
REF: 38480-001-06 C2

INVOICE TERMS:
NET 30 DAYS
Term begins from receipt of goods or
receipt of invoice in Accounts Payable,
whichever is later.

MODIFICATION REASON

Effective 01/22/07 modification number 1 is issued to: 1) Extend the period of performance from November 30, 2006 to November 30, 2007; and 2) Add funding of \$50,000.00 to the existing line item 1.

All terms and conditions remain in full force and effect.

TRC
01/22/07

The Subcontractor agrees to furnish and deliver all items or perform all services identified in this subcontract for the consideration stated herein. This subcontract expressly limits acceptance to the terms referenced herein and/or attached hereto, and any additional or different terms proposed by the Subcontractor are rejected unless expressly assented to by Los Alamos National Security, LLC in writing.

ACKNOWLEDGEMENT - PLEASE SIGN AND RETURN PROMPTLY TO:

TERRY CHACON M/S D447
P. O. Box 1663
Los Alamos, NM 87545

For the Subcontractor


For Los Alamos National Security, LLC

Vendor's Reference Number

Name and Title (Type or Print)

Name and Title (Type or Print)

By
(Signature of person authorized to sign) Date Signed

By  Jack James
(Signature) Team Leader 1/23/07
Date Signed

Line Items Continued on Next Page

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National Laboratory
Los Alamos, New Mexico 87545

SUBCONTRACT AWARD/ PURCHASE ORDER MODIFICATION

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PAGE 2 of 5

SUBCONTRACT AWD/PO NO.
38480-001-06 C2

MODIFICATION NO.
1

Operated by Los Alamos National Security, LLC under Government
Contract No. DE-AC52-06NA25396 Dated December 21, 2005

| ITEM | DESCRIPTION | QUANTITY | UNIT | ISSUE | UNIT PRICE | EXTENSION | DELIVERY |
|------|-------------|----------|------|--------|------------|--------------|-------------|
| 0001 | Service | NOT | TO | EXCEED | | \$200,108.00 | 30 Nov 2007 |

The work comprises the non-recurring engineering (NRE) costs for the electronics design of the pixel module test card, the pixel plane PCB, and the test stand to characterize the pixel modules for the Phenix experiment. The work will be performed by Fermilab's Computing Division Electronic Systems Engineering (ESE) section. ESE will design the pixel high-density interconnect required for project and is not included herein. The work consists of the following:
Pixel Module test card, Pixel plane PCB and Test stand. Labor Costs in accordance with Statement of Work for FNAL CD PHENIX Project.

PERF. PERIOD: 01 Mar 2006 to 30 Nov 2007

FOB: Orgn, Frt Col-Do Not Ins

SHIP VIA: Fed Ex. Priority #1943-0200-2

TOTAL CONTRACT AMOUNT

\$200,108.00

| | | | |
|----------------------------------|--------------------------------------|-------------------------------------|-------------|
| Integrated Contract Order | Integrated Contract Order No. | General Description | Page 3 of 5 |
| | 38480-001-06 C2 | Labor Cost covered by SOW with FNAL | |
| Modification # 1 | | | |

**Los Alamos National Laboratory
Operated by Los Alamos National Security, LLC (LANS)**

**Modification No. 1
Integrated Subcontract No. 38480-001-06**

Integrated Contract **38480-001-06** between The Los Alamos National Laboratory, hereinafter called the "LANL", and **Fermi National Accelerator Laboratory.**, hereinafter called the "Integrated Contractor" is modified as described herein. Except as modified, all other terms and conditions remain unchanged and in full force and effect.

Effective 01/22/07 modification number 1 is issued to 1) Exercise option year 2, extend the period of performance from September 30, 2006 to September 30, 2007; and 2) Add funding of \$50,000.00 to the existing line item 1.

Page 1, Change the Funded and Ceiling Amounts from "\$150,108.00" to read "\$200,108.00"

Page 2, Line 0001, 1) Exercising option year 2, extend the period of performance from September 30, 2006 to September 30, 2007 and 2) Add funding of \$50,000.00 to the existing line item 1.

| | | | |
|----------------------------------|--------------------------------------|-------------------------------------|-------------|
| Integrated Contract Order | Integrated Contract Order No. | General Description | Page 4 of 5 |
| | 38480-001-06 C2 | Labor Cost covered by SOW with FNAL | |
| Modification # 1 | | | |

**Statement of Work
Design of the Pixel Plan PCH
PHENIX Experiment
December 13, 2006**

1. Description

The work comprises the non-recurring engineering (NRE) costs for the electronics design of the Pixel Plane PCB for the PHENIX experiment. The work will be performed by the Electronic Systems Engineering (ESE) department of the Computing Division (CD), Fermilab. ESE will design the pixel KISS high-density interconnect (HOT) required for the project and it is not included in this contract. The work consists of the following items:

1. Pixel plane PCB: The pixel plane PCB holds one layer of 10 pixel modules using the KISS MDI. The area on the pixel plane PCB where the pixel modules are assembled is cooled down to meet the project's required operation temperature. The mechanical design of the board will be performed by a mechanical group assigned by Los Alamos. FSE will work on the electronics design of this board and will collaborate with the mechanical design group in the overall design of the board.

2. Responsibility for this Period of Performance

2.1. Work Breakdown Structure (WBS) Items at lowest level, Estimated Cost and Work

The planned project start date is December 8, 2006. The project schedule is dependant on the availability of the general system requirements and the specification of the Pixel Plane PCB from LANL.

For each of the items described in the section 2, Fermilab agrees to provide complete documentation of the work. This will include items schematics, board layout I artwork, bill of materials, software listings, simulation and test results. Fermilab also agrees to provide technical support via phone and video conferencing to LANL as necessary during the project. LANL will provide a system requirements document and the mechanical specification of the board for the project and ESE will provide the specification of the work done.

A WDS for the project is presented in the Appendix A.

It is estimated that this work will require 1 FTE month of Electronics Engineer (EE) and 2 FTE month of Electronics Technician (ET) to complete. See Appendix B for the breakdown of labor costs. This breakdown of labor costs does not include any material purchases or ravel costs. LANL will provide support for trips for the PL to attend

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|----------------------------------|--------------------------------------|-------------------------------------|-------------|
| Integrated Contract Order | Integrated Contract Order No. | General Description | Page 5 of 5 |
| | 38480-001-06 C2 | Labor Cost covered by SOW with FNAL | |
| Modification # 1 | | | |

meetings related to the project. Upon approvals from LANL, Fermilab staff will arrange travel through Fermilab's travel office. LANL will be billed later. It is understood that, using specifications defined by the PL, LANL will purchase necessary items for the project and ship them to Fermilab.

This agreement covers labor costs only. The source of support will be provided by LANL in the form of a LANL Memorandum Purchase Order (MPO) for the amount of \$50,000. The project work will begin after Fermilab receives the funds in the form of MPO. After the initiation of the project, Fermilab will send monthly invoices for labor to LANL. Following individuals will carry out tasks associated with the project.

- Guilherme Cardoso – PL
- Marcos Turqueti – Engineer
- Jeffrey Andersen – Engineer
- Alan Prosser – Engineer
- Ryan Rivera – Engineer
- John Chramowicz – Electronics Technician

It may be necessary for Fermilab's staff members to provide *minor* supports to the work beyond the term specified in the WBS. Further support of the test stand beyond the completion of the project will be negotiated between LANL and *Fermilab/CD/ESE*.

2.2. Coordination and Reporting

Fermilab will report all related expenditures and labor charges together with associated technical progress *in* each item of work to Patrick L. McGaughey, The PHENIX Silicon Detector Manager on a monthly basis covered in this Statement of Work. ESE will not be responsible for staffing the test stands to test Pixel planes. This statement includes the delivery of a Pixel plane PCB that will be tested by PRENIX collaborators. The responsibilities of PL of the project terminate after the successful conclusion of the acceptance testing. It is stipulated that the acceptance testing will not be tied to the availability of bump-bonded pixel modules.

2.3. Coordination with other Groups and Institutions

The **PL** for the **project** will collaborate with Fermilab's **PFD division** and vendors as necessary.

| Version | Issue Date | Cost (\$K) Added | Concurrence (Initial) | Description of Change |
|---------|------------|---------------------|--------------------------|--------------------------|
| | | \$50,000.00 | PM | Original |

Extension for SOW for FNAL CD PHENIX Project

No other changes will be made to this modification.

Attachment A

| LANL/SNL MOU | | | | | | | |
|---|------|------|------|------|------|------|----------------|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| <i>TAI/ PIDADS, & ECF Detection</i> | | | | | | | |
| Drawing Review | 200 | 50 | 10 | | | | |
| Construction Consult | 50 | 200 | 150 | | | | |
| Evaluation Consult | | | 25 | 100 | | | |
| Test & Accept Consult | | | | | 100 | 150 | |
| <i>TAI/ & PIDADS Assessment</i> | | | | | | | |
| Drawing Review | 200 | 50 | 10 | | | | |
| Construction Consult | 50 | 200 | 150 | | | | |
| Evaluation Consult | | | 25 | 100 | | | |
| Test & Accept Consult | | | | | 100 | 150 | |
| <i>TAI/ & PIDADS Delay Barrier</i> | | | | | | | |
| Drawing Review | 200 | 50 | 10 | | | | |
| Construction Consult | 50 | 200 | 100 | | | | |
| Evaluation Consult | | | 20 | 75 | | | |
| Test & Accept Consult | | | | | 75 | 50 | |
| | 750 | 750 | 500 | 275 | 275 | 350 | 2900 K Dollars |